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# West Europe Report

SCIENCE AND TECHNOLOGY



FOREIGN BROADCAST INFORMATION SERVICE

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14 May 1984

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## ADVANCED MATERIALS

### BRIEFS

LEAD COMPOSITE FOR BATTERY--Achieving an 8 percent weight reduction in lead batteries seems to be of little interest, except perhaps when it involves industrial vehicles, or better yet, submarines, where the batteries weigh tens of tons. Replacing traditional lead alloys with a pure lead composite reinforced with carbon fibers, the Laboratory for Mineral Physical Chemistry of CNRS (National Center for Scientific Research), at Villeurbanne, in collaboration with the Jean Brochier company, has succeeded in fabricating electrode grids that are four times lighter. Moreover, the electrochemical behavior of pure lead is better than that of lead alloys (less risk of hydrogen release). The fabrication process for these grids consists of deeply impregnating a carbon fiber fabric with an electrochemical deposit of lead. Copper is first deposited chemically to increase the conductivity of the fibers, and a mixed carbon-glass fabric is used to improve the mechanical strength of the electrode after its plating. The process can be a continuous one. Battery cells using negative grids fabricated by this process are being tested by CEAC (a CGE subsidiary), and research is being carried out on positive grids. [Text] [Paris L'USINE NOUVELLE in French 5 Apr 84 p 9] 11,023

CSO: 3698/360

BRIEFS

BELGIAN CONTROL SYSTEM AT KOUROU--The ETCA [expansion unknown] company, a subsidiary of ACEC [Charleroi Electrical Engineering Shops] (Belgium), will deliver to the CNES [National Center for Space Studies] the electronic command control (CCE) system for the ELA [Ariane Launching Group] 2 of Kourou. This imposing equipment group, which will be installed on the No 2 launch site for the Ariane rocket, differs from the preceding control system (ELA 1) in the connections between equipment, which will be done in a digital manner; the redundant equipment; a decentralized computer system; and its compatibility with the launchings of the future Ariane 4. The CCE for ELA 2 is composed of 27 electronics cases in the forward zone, 17 electronics cases and 2 consoles in the rear zone, 1 central computer, 57 microcomputers distributed through the system, and software that contains more than 300,000 instructions. [Text] [Paris L'USINE NOUVELLE in French 5 Apr 84 p 11] 11267

CANADIAN 1984 SPACE RESEARCH BUDGET--Ottawa--The federal minister of state for science and technology, Donald Johnston, announced, in Ottawa on 19 March, a Can\$122.2-million increase in government expenditures in the area of space research. This increase (38 percent), he stated, will raise the total amount devoted to that sector to Can\$466 million over the next 4 years. "Canada's space industry has an annual growth rate of 50 percent, and export sales are more than 70 percent of total sales," Johnston added, stressing that "Canada is the only country whose space industry's sales exceed the governmental expenditures in that area." The Canadian space industry, he pointed out, employs more than 3,200 persons. [Text] [Paris AFP SCIENCES in French 22 Mar 84 p 26] 11267

CSO: 3698/359



## CIVIL AVIATION

### SURVEY OF EUROPEAN SUBCONTRACTORS FOR AIRBUS PROGRAM

Brussels LE SOIR in French 19 Apr 84 p 7

[Article by Pierre Bary: "In the Sky and Space with Ease--More European Subcontractors for Building the Small Airbus A-320"]

[Text] Toulouse, April--Airbus Industrie's assembly room at Toulouse-Blagnac gives only a partial idea of the complexity of the tasks to be accomplished in order to produce a transport airplane. Here they put together the various elements prefabricated in the various countries of the consortium, delivered daily by big-bellied airplanes called "Super-Groupis." Most of the subassemblies are already fixed to the main wing elements or to fuselage sections. Thus the technicians who do the final fitting have only to fix attachment pieces and connectors, as with an Erector Set.

The subcontractors of all sizes, who are called the equippers, number in the hundreds. As we were told on the occasion of our visit to Toulouse, no fewer than 300 American suppliers are involved in construction of the European A-300 and A-320 Airbuses. This extends from the main engines to the APU [Auxiliary Power Unit] auxiliary engine used for supplying energy on the ground, and includes the air-conditioning equipment, the galleys and navigation systems.

The Americans have long controlled this market because of a certain negligence on the part of the Europeans, who today are striving to close the gap. Indeed, it is no small matter to let contracts amounting to nearly half the value of an airplane go into the hands of others. A surge in that direction has occurred on the occasion of the launching of the small Airbus A-320, to the point of arousing reactions on the other side of the Atlantic.

#### Electronic Equipment

This does not mean that the Europeans are starting from scratch in this area. The French Air Navigation Equipment Co (SFENA), whose capital is controlled by the nationalized company Aerospatiale, has always been No 1 in the world in production of gyroscopic horizons, covering 85 percent of the transport-aviation market. They are found, for example, on Boeing's most recent airplanes, the B-767 and the B-757.

The SFENA, which equips the French military helicopters and airplanes with automatic flight-control systems, has broadened its market with the most recent Airbuses, which are equipped with digital computers and various apparatuses for electronic visualization. The firm has become the No 1 European maker of the gyrolasers used in commercial and military aviation.

Thomson-CSF, which is developing its aeronautical activities in its two plants at Pessac and Haillan, in the Bordeaux region, employs more than 1,300 engineers (out of total personnel of 7,200) in research in the avionics sector. The firm is also participating in the equipping of the Airbus A-310, not to mention the principal military programs, such as for the Mirage 2000, the Mirage F-1 and the Atlantic G-2. It is also making electronic direction systems for the various missiles of MATRA [Mechanics, Aviation and Traction Co]: the Kormoran, Otomat, Super-530 and Crotale.

The two centers of the avionics division of Thomson-CSF are making micro-electric circuits designed especially for radars. Serigraphy is a technique increasingly used in the making of microcomponents, which are then placed in cases used both in ground equipment and in airborne equipment.

#### Composites Taking Over

The two principal airplane builders, Dassault-Breguet and Aerospatiale, have been making increasingly broader use of composite materials in the building of airframes. Applications for these new products have also been found in the building of helicopters, whose gross weight it has been possible to reduce without affecting shock resistance. Aerospatiale uses these materials for making not only propeller blades but also rotors, which have better flexibility than with the old mechanical systems, which are both heavier and more complicated.

The European Propulsion Co (SEP), which employs more than 3,400 people in making motors for launchers and missiles, has made considerable progress in research on carbon. This new material is both lighter than metal and more resistant to heat. Its applications outside the rocket sector have progressed to the point of a doubling of its turnover over the last 3 years.

Brake discs made of carbon have proved to give very high performance in racing cars. They offer excellent heat-shock resistance, with lower wear than for conventional brakes. Thanks to their greater tolerance of heat, they tolerate repeated stresses, such as occur in automobile races.

With these intrinsic qualities, carbon-disc brakes meet the needs of aviation especially well. They have been chosen for putting on the Mirage 2000, which will be formed into flights this summer, and for the Airbus A-310. Just for this year, the SEP has received orders for the fabrication of 1,500 brake discs. The future Airbus A-320 will be equipped with the same braking system. It has, indeed, been calculated that replacement of steel brakes with carbon-disc brakes makes it possible to gain 400 kg in the mass of the airplane--a fact which, after 1 year of functioning, translates into a saving of several thousand liters of fuel.



This new composite material, for which applications can be found in the railway field also, especially for the TGV [High-Speed Train], is also being called on for eminent service in the medical field. It has in fact emerged that carbon is compatible with the human organism, which makes it possible to use it for making prostheses or dental implants.

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## CIVIL AVIATION

### REGIONAL DISCORD MAY DELAY BELGIAN PARTICIPATION IN AIRBUS

Brussels LE SOIR in French 28/29 Apr 84 p 8

[Article by P.B.: "The FLAG (Flemish Aeronautic Group) Wants Its Part Too in the Small Airbus A-320"]

[Text] The government is shortly to announce its decision on a BF 1.6-billion participation in the research-and-development work for the small Airbus A-320. Of the BG 100 billion in credits necessary for building this new-generation airplane, about 95 billion will be contributed by the three principal partners--France, the FRG and Great Britain--with two other countries, Spain and Belgium, coming in for the other 5 billion.

As for the Airbus A-310, our country would have the mission of producing the moving parts in the front part of the wing surfaces, also called the wings' leading edges. But there will be no need this time for a more complex piece, called a Krueger, serving to connect the wing to the fuselage and comprising a movable flap.

The Belgian member of the European consortium is Belairbus, which for the A-310 program has received received national subsidies and subsidies from the Walloon Region. Smaller shareholdings have been taken also by aeronautical firms such as Sonaca and Sabca, which have benefited from most of the fallout from this program, which, furthermore, will continue to be a very costly one for so long as the profitability threshold has not been reached--a threshold generally set at around 350 to 400 planes built. That threshold is still quite a long way off, since, at present, some 29 Airbus A-310's have been delivered out of a total of some 100 firm orders. In the case of the Airbus A-320, the number of firm orders taken so far is 51 units.

On the eve of the decision that the government is to take on Belgium's participation in the A-320 program, the Flemish aeronautics group FLAG recently announced that it does not agree on maintaining the present structure of Belairbus. The FLAG, though not challenging the fact that Belairbus remains the Belgian interlocutor with the European consortium, calls for the creation of two wings within Belairbus, with each wing receiving national, regional and private-sector participation.

These new community demands present the risk of delaying the government's decision and perhaps of compromising our participation in this program, which has already got started in our big neighbor countries.

## COMPUTERS

### PRODUCTS, R&D AT FRANCE'S SOFTWARE ENGINEERING INSTITUTE

Paris ZERO UN INFORMATIQUE HEBDO in French Special 'Midi-Pyrenees'  
13 Feb 84 p 13

[Unsigned article]

[Text] The Software Engineering Institute (IGL) provides a link between the university and industry.

Its two founders were Michel Gallinier, who is in charge of the software engineering department at Paul-Sabatier University, and Gerard Germain, who until January 1982 (when IGL was created) was an engineer at Electronique Serge Dassault. IGL--legally an SARL (limited liability company) with a capital of 150,000 FF (French francs) entirely held by its founders--presently consists of 25 high level software engineers and five administrative employees.

#### Single Goal

IGL has only one goal: software engineering and nothing but software engineering. Its activities are distributed among five departments: methods and training, products, consultation, quality, developments and research.

The methods and training department works on the implementation of software engineering methods concerning the formalization of specifications.

To precisely define and solve the problem to be computerized, IGL offers its customers two products. The first, SADT (Structured Analysis Design Technics), developed by Softech in the United States, is distributed exclusively by IGL in France. This hierarchical and structured method uses graphic formalism to describe system, software, or procedure specifications.

Some of the SADT users trained by IGL are CNES (National Space Studies Center), CEAT (Toulouse Aeronautic Studies Center), Matra, and Renault Castres.

The second product developed by IGL, Mach (hierarchic method of analysis and design), makes it possible to formulate a computer solution, and to study how a problem can be solved.

IGL provides training in these two methods--SADT and Mach--through five-day courses. The price of courses and documentation is 70,000 FF (without taxes) for each of these two products.

IGL's product department implements software packages designed to measure the complexity of software programs.

In addition, Qualimetre C, a multilanguage tool which makes it possible to analyze the source code of programs written in Fortran 77, Pascal VAX, Pascal VS, Cobol ANG, PLM 86, and PDL, is an analyzer used as maintenance aid (documentation and development); at the same time, it facilitates program testing by providing a basic logic path to be tested; and lastly, by measuring the hierarchic and structural complexity of programs, Qualimetre C constitutes an aid for software quality assurance and control.

In a single-language VAX version, Qualimetre C is offered at the price of 65,000 FF (without taxes).

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## COMPUTERS

### USER STUDY FINDS FAULT WITH BULL AFTER-SALES SERVICE

Paris ZERO UN INFORMATIQUE HEBDO in French 20 Feb 84 pp 14-15

[Article by Fabienne Tisserand]

[Excerpts] "Despite the wishes of the management and the technicians' competence, Bull's service is still far from perfect"; these comments from Club 01 members, users of the French manufacturer's computers, gathered together by 01 HEBDO for a lunch-discussion on "Bull service," confirm and support the findings of 01-Datapro's latest study of customer satisfaction.

Since the beginning of the year, Club 01 has organized on the first Wednesday of each month, a lunch-discussion on a topic selected by its members.

"Bull service," on this month's agenda, has already been one of the aspects of 01-Datapro's study of customer satisfaction among French users.

This very complete study covers a large sample of Bull equipment users, since 454 usable responses were returned.

An analysis of this study's results discloses a certain weakness in Bull's after-sales service. In 1983 for instance, "intervention speed" was rated 2.43 out of 4 (while the average French rating for all manufacturers was 2.95). "Effectiveness of intervention" obtained 2.46 points (against a national average of 2.88).

These standings obviously depend on type of equipment. For instance, in the case of "interventions per incident," two systems do not even rate 2 out of 4 (1.98 for the DPS 4, and 1.94 for the Mini 6). On the other hand, the 66/DPS received excellent marks (3.33 and 3.25). Without attempting to be exhaustive, the Club 01 lunch-discussion sought to flesh out the dryness of these figures with various testimonials (added to the many comments already published by 01 MENSUEL in other issues).

Wait Six Months

"Service problems depend on computer type and the region of France in which it is installed."

In general, the luncheon participants confirmed that they found the service "relatively satisfactory" for the equipment and its maintenance, with the experience relating especially to the DPS/7 and DPS/8, but "dramatic" as soon as it involved software, "which is more serious because it is the foundation of utilization."

Some even went so far as to state that "for the basic software there is so to speak no more service. In case of failure, Bull merely notes the product's problems and advises the user to wait for the new version of the software, which involves a delay of about six months."

"The essential problem with service is the contract," say the users. "No true negotiation takes place between the parties. The manufacturer offers his customers no possibility of modifying the terms of service contracts. The user's only power consists in accepting or refusing them."

#### Lion's Share Contracts

"The contracts are unfair," a Club 01 member pointed out. "They impose on the manufacturer a maximum intervention delay (generally four to eight hours), but never a repair deadline." A Bull technician therefore has to travel within four or eight hours for the contract to be respected, even if the computer is not back in operation for several days.

"Bring the competition into play and maintain one's independence from the leader of the French computer industry," is the solution found by a large national company which has particular service problems (schedule constraints). It has opted to "withdraw from Bull the service for all its Mini 6's and turn it over to an engineering firm." For a lower cost, the latter offers daily service with delay penalties if the equipment is not repaired within 12 hours.

The users appear to attach great importance to these penalties, "more as a matter of principle, because they establish a balance of power between suppliers and users, than for the financial advantages they provide." In fact, they acknowledge "that they don't demand the payment of the penalties, being satisfied by the fact that they are stipulated in the contract."

This example proves that "while service contracts impose upon the manufacturer the need to service the equipment it sells, they allow the user full freedom to find elsewhere the specialists which it deems most capable of servicing his equipment."

#### Lack of Coordination

The users appreciate the quality of Bull computers and the competence of its personnel, but they condemn "the lack of organization within the company."

For those in the provinces especially, "there is no link between production groups and the technicians in the region."



# Criteria

Models	(A)	(B)	(C)	(D)
All computers		2.95	2.88	2.55
Mini 6	87	2.21	2.23	1.94
Niveau 61	27	2.81	2.81	2.54
61 DPS	87	2.54	2.72	2.58
Niveau 62	23	2.45	2.27	2.05
DPS 4	52	2.22	2.31	1.98
Niveau 64	22	2.36	2.68	2.14
64 DPS	44	2.40	2.53	2.16
DPS 7	31	2.40	2.20	2.00
Niveau 66	10	2.60	2.40	2.00
66 DPS	4	3.25	3.00	3.33
DPS 8	27	2.73	2.44	2.04
CII-HB overall	454	2.43	2.46	2.19

Key: (A) Number of responses  
 (B) Speed of service interventions  
 (C) Efficiency of service interventions  
 (D) Interventions per incident

Bull service viewed by all participants in the Ol-Datapro 1983 study  
 (maximum rating = 4)

One of them gave the example of Multics, which "is a victim of its own success in France." Bull "is not capable of offering a technician capable of providing service in all the regions in which its equipment is installed."

In the eyes of the users, "this lack of coordination among Bull's various groups, already observed several years ago, has become more evident in the past two years."

The users are not blaming "either the management or the basic technicians," but they do strongly criticize "the weakness and lack of motivation of groups at intermediate hierarchical positions, which impede the company's proper operation."

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## COMPUTERS

### CANADA'S NORTHERN TELECOM INVESTS IN NEW 'VIENNA'

Paris ZERO UN INFORMATIQUE HEBDO in French 12 Mar 84 p 4

[Article by Jean-Louis Cousin: "Northern Telecom's Vienna: Office Automation and Communications of All Kinds"]

[Text] Northern Telecom's new Vienna series of computers and multifunction terminals was introduced last week to all European media at La Napoule, near Cannes, in a spectacularly staged display (equipment springing up from the ground among thunder, lightning and smoke) and on a background of futuristic audiovisual effects. The North American telecommunications giant was thus showing how much importance is now attaches to the European data-processing and office-automation market.

Indeed, Northern Telecom decided to launch its Vienna line on the European market even before doing so in North America.

The Vienna line, which is designed to be integrated to long-distance networks (SNA [systems network architecture], BSC [binary synchronous communications], X25) as well as in local networks (especially Ethernet but star networks as well) and which allows the user to use Xenix as well as MS-DOS, does indeed fit with the "open world" concept which Northern Telecom decided to adopt as a guideline for its policy late in 1982.

#### "Open World"

Edmund B. Fitzgerald, chief executive officer of the Canadian parent company, Northern Telecom Ltd (the name recently adopted for Europe as a whole is Northern Telecom Data System), had not failed to come in person to introduce the new series and gave the following additional information concerning the "open world" concept:

"'Open'--for 'Open Protocol Enhanced Network'--refers to a network that is open to the various protocols. 'Open world' demonstrates our commitment to a planning organization, new products and advantages that will enable digital packet-switching systems to form the core of integrated data-processing systems. It will be used to connect equipment from various origins."

"'Open world' marks the convergence of data processing, telecommunications and office automation. This convergence makes it possible to set up an integrated data-processing system at a profitable cost."

Confident that its concept will indeed be profitable, Northern Telecom did not hesitate to make the necessary investments; 50 million Canadian dollars (close to 320 million French francs) will be invested in Vienna over 3 years. "Vienna has an open architecture that will require complements, not changes, to integrate future capabilities," the designers of Vienna also indicated.

For the time being, the new line consists essentially of three resource-sharing computers (models A, B and C) built around the Intel iAPX-286, "multipersonality" terminals (in English: multifunction terminals) built around the iAPX-186, which can have four degrees of power (intelligent terminals, terminal computer, terminal system and color terminal system), a line of seven printers (high-speed, letter-quality, ink-jet printers, etc.) and a range of disks.

#### Mice and Graphic Functions

The intelligent terminal is the basis of the system. As far as it is concerned, it can access only applications under Xenix but, as an option, it can be used as a personal computer (it is then called a terminal computer) which can then use MS-DOS as well as Xenix.

One notch above is the terminal system provided with a mouse and graphic functions. The boxed insert [not translated] provides more detailed technical information on the various types of equipment which are already available, and their software.

Users of the present line (NT 435, 445, 555 and 585) can progressively change to Vienna systems thanks to a "turbo" processor based on the iAPX-236.

The basic price of multifunction terminals is of the order of 40,000 French francs.

Here are a few examples of configurations and prices:

- monochrome system with 256 Kbyte [8-bit bytes] of core memory, with a 640-Kbyte diskette and a 15-Mbyte hard disk: approximately 73,000 French francs (taxes not included);
- model-A system with 5 work stations, 1 Mbyte of core memory, 14 Mbyte of disk memory, a 40-Mbyte cartridge, a 400-cps printer and SNA and BSC access: around 310,000 French francs (taxes not included);
- model C, 2 Mbyte of core memory, 20 screens (including 4 terminal systems), 160 Mbyte on Winchester disks on sale, 40 Mbyte [as published], 8 printers (two 200-cps, 2 letter-quality, two 600-l/mn and 2 ink-jet printers). Total price: around 1.3 million French francs (taxes not included).

## Over 4,200 Systems in Europe

As Barry W. Eames, European vice-president of Northern Telecom Data Systems, commented:

"We have installed over 4,200 systems in Europe. Our credibility is based on our ability to meet our existing customers' needs as well as those of new users... Northern Telecom is now introducing a system that will enable our customers to get the benefits of Vienna without calling into question their past investments."

As far as the evolution of the group as a whole is concerned, Edmund B. Fitzgerald is expecting sales of no less than 8 billion Canadian dollars (i.e. over 50 billion French francs!) by 1988, compared with 3.3 billion (close to 21 billion French francs) in 1983.

As for Chris Jackson, chief executive officer of the French subsidiary (the former Data 100), his forecast is that the French subsidiary will triple its present sales (120 million French francs in 1983) within the next four years.

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## COMPUTERS

### BULL FINANCIAL STATUS IN FRANCE, BELGIUM FOR 1983

#### Losses in France

Paris AFP SCIENCES in French 22 Mar 84 p 39

[Text] Paris--Francis Lorentz, director general of the Bull group, announced to the press on 19 March that the leading French computer manufacturer once more suffered a loss of 625 million francs in 1983, but did succeed in reducing it by one-half compared to 1982, when it was 1.35 billion francs.

The Bull group, created in 1983 by a merger of CII-Honeywell Bull, Sems (which was part of the Thomson group), and Transac (which previously belonged to CGE), into Compagnie des Machines Bull, achieved a 21.3 percent increase in revenue (for a comparable structure) compared to 1982, with a turnover of 11.6 billion francs, 38 percent of it in exportation.

The objective remains to reach a financial balance in 1986 in keeping with the operating contract signed with the government at the beginning of 1983, so that Bull will be, in Mr Lorentz' words, "an enterprise worthy of the name," and not a grouping of "national companies."

The losses suffered by CII-HB in 1983 once more amounted to 596 million francs. In 1982, its losses had tripled with respect to 1981: 1.35 billion against 449 million.

According to its management, Bull's "improved results" for 1983 are due to the reorganization of the industrial sector and the solution to the technical problems of the Angers (Maine-et-Loire) plant, where 3500 employees are manufacturing DPS-7 and DPS-8 computers.

The group's industrial investments amounted to 650 million francs, 20 percent more than the preceding year, stressed Mr Lorentz. Research and development was allocated 1.3 billion francs. All in all, 2 billion francs, about 20 percent of revenues, were devoted to "investments to prepare for the future," with Bull scheduled to offer new computers in 1985 and 1986.

But financial costs have remained considerable, amounting to 7.2 percent of revenues at the end of 1983, compared to 9 percent at the end of 1982, indicated Mr Lorentz. Strict management and reduced operating costs are one of the major objectives for 1984, he pointed out. Quality, another weakness of the firm in the view of its managers, has also been assigned priority for the current year.

#### Profits in Belgium

Paris ZERO UN INFORMATIQUE HEBDO in French 20 Feb 84 p 56

[Excerpts] More rapidly than anticipated, Bull is showing a profit. Despite the inevitable problems suffered in the merger with Sems and Transac, and thanks to an excellent first half, 1983 profits will range between 70 and 80 million FB (Belgian francs). The atmosphere is therefore optimistic.

Belgium was the only country outside France in which were represented the three entities of the merger that created the Bull group. Operational since August, the company is legally established only since last January, a long quarter spent in "becoming acquainted," organizing, and orchestrating the activities of some 600 people in Belgium and Luxemburg.

Bull's financial results--actually those of the former Honeywell-Bull, since the balance sheet has not been consolidated--will be available only in May, but it is already known that revenues will show an increase of 13.5 percent, and that a substantial profit of 70 to 80 million FB will have been achieved after two years of negative balances.

On the commercial plane as well, the gross result should show a 4 percent growth over the previous year, and a net return--taking into account equipment returned for replacement, and so on--increase of 18 percent.

Jean-Jacques de Bassompierre, director general of Bull Belgique declares himself satisfied with these results, especially since they were achieved during a year stamped by a major reorganization of the enterprise--"we actually created a fourth company starting with the three entities HB, Sems, and Transac"--a situation which certainly did not fail to generate concern and uncertainty both among customers and within the companies.

Still on the topic of results, the two new partners turned in a poorer performance: Sems had a negative balance of 30 to 35 million FB, while Transac ended approximately even.

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## COMPUTERS

### STUDY SHOWS FRANCE LACKS COMPUTER SPECIALISTS

Paris AFP SCIENCES in French 29 Mar 84 p 33

[Article: "There Is a Shortage of Nearly 6,000 Computer Specialists in France"]

[Text] Paris--France has a shortage of 5,600 computer specialists, and this lack is certainly going to continue for several years, according to a report published by Syntec Informatique, the association organ of the computer-service companies.

This year, France needs 12,800 computer specialists, 6,800 of which will result from creation of jobs and 6,000 for replacement of personnel, whereas only 7,200 persons will go into that field of work, out of 9,200 graduates. A catch-up is all the more urgent because the personnel growth is going to be rapid: the number of persons working in the computer sector will go from the present 194,000 to 254,500 in 1990.

A total of 171,000 persons will be working in the computer-service departments of companies in 1990 (i.e., 67 percent of those in the profession), as against 139,000 at present, while the computer-services and data-processing consultant firms (SSCI's) will employ 46,300 as against 27,000 in 1984. Personnel strength will increase by 4,000 persons in the equipment-manufacturing firms, reaching the total figure of 30,000, while the distribution sector will undergo a veritable job explosion, going from 2,000 persons in 1984 to 7,200 in 1990.

The shortage of computer specialists is having harmful consequences for the French economy as a whole, which is gradually losing its competitiveness, Syntec Informatique stresses. At the level of the computer industry, "any delay presents the risk of producing irreversible situations, and slots of vital importance, such as computer-aided design and standard software for microcomputers, are already dominated by the foreign firms."

On the other hand, the shortage of computer specialists is producing an upswing in the pay scales, with increases considerably greater than the price increase authorized. This phenomenon is causing, in particular, a decrease in the profit margins for the SSCI's and is slowing down their investment. Their profits, Syntec Informatique indicates, has reached 1.7 percent of turnover, while their training efforts represent 3.5 percent of it.

In order to remedy this situation, Syntec Informatique proposes the institution of a short-term emergency plan providing in particular for the creation of a permanent body for monitoring the training of computer specialists, a structure for ongoing training, a single commission for harmonization of the programs of the training systems, and the training of 200 high-level trainers. For the medium term, the association organ calls for creation of a National Higher Computer School and the institution of computer-values units in all the higher-level training programs.

11267

CSO: 3698/359

## FACTORY AUTOMATION

### STATUS OF FRENCH ADVANCED AUTOMATION, ROBOTICS PROJECT

Paris ZERO UN INFORMATIQUE HEBDO in French Special 'Midi-Pyrenees'  
13 Feb 84 p 6

[Article by BEM]

[Excerpts] Two objectives of the ARA (Advanced Automation and Robotics) program: encourage and bolster robotics research, and facilitate transfers to industry.

The ARA program officially began in October 1980. Originally supported by specific DGRST (General Delegation for Scientific and Technical Research) credits, and later (in 1983) complemented with ADI (Association for Information Processing Development) funds, the program gathers together a large number of research groups from CNRS (National Center for Scientific Research) and nine other agencies.

Since 1983, four contract-programs involving the AEC, CNRS, Inria (National Institute for Information Processing and Automation Research), and Onera-Cert (National Office for Aerospace Studies and Research-Toulouse Center for Studies and Research), have been the core of the action. The program, organized around four major topics (advanced remote operation, robotics mechanics and technology, general robotics, and flexible production systems), tends to achieve two objectives: on one hand, encourage and bolster robotics research in France, and on the other hand, facilitate transfers to industry.

"We have tried to work with actual shops, particularly in the area of flexible production systems," we were told by Georges Giralt, CNRS research director and the man in charge of the ARA program. "For each of the other three areas, we have adopted a group of manufacturers who are observing our work. In these 'laboratories without walls,' robot manufacturers, large users of robots, and large engineering companies, collaborate with researchers to determine the major directions to be followed, as well as the topics likely to become significant needs of the socioeconomic sector and to be included in research."

At present, the ARA program is entering its second phase, the expansion of its initial action, so as to increase the program's efficiency in transfers to industrial partners, while retaining and developing its basic research features in computer integrated manufacturing.

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CSO: 3698/360

## MICROELECTRONICS

### THOMSON SEMICONDUCTORS TO SPECIALIZE IN SEMICUSTOM IC'S

Paris ELECTRONIQUE ACTUALITES in French 17 Feb 84 p 17

[Article by F. Grosvalet: "Thomson Semiconductors attempting to multiply their semicustom IC sales by 5 this year."]

[Text] Grenoble. The Special Circuits division [DCS] of Thomson Semiconductors, created in 1981, and operational since the spring of 1982 (see ELECTRONIQUE ACTUALITES of 5 April 1982) is changing its mission. Whereas its specialty until now was the design of special circuits (either true custom or prediffused), it is now devoting its activities to semicustom IC's only, either prediffused or precharacterized, both for the Thomson group and for the external market.

DCS' ambition is to use the Grenoble center, to which connected is or will be a network of distributed terminals through modems' as an efficient means of entering the field of bipolar prediffused and precharacterized circuits, both linear and CMOS. The division is already using a decentralized design center in Paris (the La Boursidiere Center) and one of its distributors will be equipped with terminals connected to the Grenoble VAX 11/780 during the current quarter.

In the area of precharacterized circuits, Thomson Semiconductors intends to associate each family of prediffused circuits to a family of standard cells using a similar library, in order to offer the user a choice. The latter will therefore have the capability of starting a design using prediffused circuits, and finally switch to library circuit if this is preferable.

The first step in this area will be taken in mid-1984 with the introduction of a precharacterized 3mm circuit with 40 functions in the library, including RAMs and PLAs.

According to DCS, the demand for semicustoms is beginning to pick-up in France, and the company is contemplating multiplying its sales in this area by 4 to 5 in 1984 (since 1982, it had already accomplished 40 personalizations, 15 of them for customers outside the group.)

## A Family of Prediffused 2mm, 2 ns CMOS to be Available at year-end 84

In the area of prediffused logic arrays Thomson Semiconductors, who today are marketing two ECL 500 and 1000 gate arrays with a 1.2 ns delay per gate (AMCC second source) and 4 3mm 360, 648, 1080, and 1458 3-input gate arrays with a single layer metal (equivalent to 540 to 2,250 2-input gates), and 3 ns delay per gate; is expected to introduce an HBIP II bipolar family, and a 2 mm CMOS.

The first will include 1000, 1700, and 2500 gate arrays characterized by an internal propagation time of 1 ns. These internal ECL arrays will be externally either TTL-LS or ECL compatible. The first to be introduced should be the 1700 gate model in mid 1984.

In the CMOS area the HCMOS II family (from EFCIS [Research and Fabrication of Integrated Circuits] in 2 mm technology using two-layer metal is expected to be introduced at the end of the year.

It will include 2000 to 3000 gates with a propagation time of 2 ns per gate. DCS is starting with a high level of integration for its 2 mm CMOS family without overlap with the current 3 mm family since the 2 series are intended for totally different markets. The latter, in particular, should be reserved to low-cost applications with low complexity (it is interesting to note, by the way, that in this area, the most used array is the one with 1000 gates).

Still in the logic area, the company is contemplating marketing a 2 mm bipolar technology STL family (both prediffused and precharacterized), but not before 1985.

In the linear area Thomson Semiconductors, who are currently marketing two 20 V, 550 MHz polyuse arrays integrating 524 and 800 components (the latter introduced at the end of last year), hopes to market one new linear prediffused circuit every six months. The first step in this strategy will take place in April or May of this year, with the introduction of a 40 V polyuse integrating 250 components (this circuit will be quite similar to MCE's 40 V model).

A 400-component 20 V analog bipolar array with a 2 GHz switching frequency is also expected to be introduced in 1984.

As far as personalization assistance is concerned, Thomson Semiconductors is offering a varied array of tools and services ranging from diffusion or custom mask-design to complete personalization starting from specifications, logic schematics, timing charts, or even discrete-component models.

In the case of a design to be carried out by a user, the company offers CAD tools (digital conversion software, Silver Lisco physical design and layout, and the EFCIS EPILOG simulation program) which allow him, either from Grenoble or from a terminal connected to the center, to design



his circuit up to logic simulation, and to define test sequences. From that point on, 4 weeks are required for the first samples to be available (one week to finalize the design, one week for mask design, one week for processing, and one week for testing).

DCS has very powerful design and test tools in Grenoble (40 MHz, 144 channel Genrad GR 16 and Sentry 16). Modules currently available range from the 16-pin DIL modules (plastic or ceramic) to the 94-pin Fakir modules (144 pins by the end of the year), including ceramic and plastic chip carrier (Surpicop type capable of being soldered on printed circuits).

6445

CSO: 3698/366

MATRA'S 1983 EARNINGS IN COMPONENTS, DATA-PROCESSING

Paris ZERO UN INFORMATIQUE HEBDO in French 20 Feb 84 p 8

[Article by Guy Hervier: "MATRA (Mechanics, Aviation and Traction Co) and the New Technologies--Components: Persistence and a Sign; Data-Processing: Time for Reflection"]

[Text] Restructuring, modernization and competition were the three main ideas ardently defended by Jean-Luc Lagardere on the occasion of presentation of the MATRA group's 1983 results--an occasion for detailing the results and objectives of two sensitive sectors: data-processing and components.

The mother company, MATRA, grouping the "Military" and "Space" activities and the administrative functions at the group level, approached Fr 6 billion in turnover. On the overall level, the MATRA group, for its part, with its roughly 150 subsidiaries, exceeded Fr 13 billion--up 11 percent over 1982--and showed a net profit of Fr 30 million.

While the group's base still consists of activities in the military, space, transport and automatic-electronics areas, MATRA has also been turning toward data-processing and semiconductors in the last several years. In order to do so, it has sought to develop through cooperation, mainly with American companies that are prestigious and are leaders in their components sector, since they include Intel and Harris.

And data-processing? "Activity in that area is not very brilliant," Jean-Luc Lagardere concedes, and the figures show that he is right. Modest turnover and results rather in the red. MMS (MATRA Micro Systems) registered losses of Fr 20 million in 1983, for a 1983 turnover of Fr 53 million, and the situation on the financial level appears scarcely any more brilliant for the year in progress.

MATRA, accustomed to dominant positions in most of the sectors in which it operates, could not be content with such a situation. Restructuring of that branch is therefore being carried out in two phases. The first was accomplished in December 1983 with the retrocession to the Datapoint firm of a part of its capital in MATRA Informatique.

The new entity, christened Datapoint-MATRA Informatique, has therefore become 80-percent American. Shunted into an "unsatisfactory" commercial and maintenance role, MATRA wanted to revise the terms of that agreement, so as to regain a certain liberty enabling it to develop on the basis of its own forces.

#### 10,000 Alices Sold

On a practical level, this operation is being accompanied by an agreement relating to fabrication of Datapoint materiel in the MATRA plant of Wintzenheim, near Colmar, in Alsace.

That unit, inherited from the revival of Jaz activities, will initially produce 8820 multifunction intelligent terminals, and later, other types of system.

MATRA is thus intending to optimize the utilization of its production capacities, despite the load of making Tandy microphones for Europe, as well as the Max and Alice computers, both presented at the last SICOB [Exposition of Office and Business Supply Industries and Office Organization].

On the commercial level, "we have sold all the TRS-80, Model 4, that we have made," Jean-Luc Lagardere specifies, "and our Alice beginner microcomputer has met with a certain success, with 10,000 units sold since mid-November 1983, when it was launched. Our desire for a presence in this sector is leading us to define an ambitious program that should be unveiled shortly."

The family of household computers is to be filled out with new elements, and MATRA is indeed counting on obtaining a serious position in the professional-microcomputer field. After the contract obtained with the Ministry of Education of Quebec, it hopes to become one of those chosen in the future by its French counterpart. Finally, it means to present a plan with regard to "technical data-processing for the engineer and instrumentation"--a field in which the foreign domination is flagrant.

#### MATRA-Harris: Profitability in 1985

The semiconductor sector--another branch destined to rapid expansion in the coming years--has produced "a certain disappointment" as regards its results, with bigger losses than expected--about Fr 180 million for MATRA-Harris Semiconducteurs, which is more than the Fr 145-million turnover.

On the technological level, one of the two French poles has reached its objectives. In proof of this, Harris, whose interest is equivalent to that of MATRA, has just given its agreement to continue its financing actively. The two companies are going to reinject Fr 200 million each. Continuance of its development and improvement of its output will constitute the main objectives for the year 1984. This should make it possible to reduce the losses to Fr 70 million in 1984 and to reach the profitability threshold as of 1985.

# The MATRA Group in a Few Figures

<u>Branches</u>	<u>1983 turnover (millions of francs)</u>	<u>1982 turnover (millions of francs)</u>	<u>1983 Personnel strength (estimate)</u>	<u>Percentage capital held by MATRA for its subsidiaries)</u>
Data-Processing	509	340	1,055	
including:				
- Datapoint-MATRA				
Informatique	292	266	385	20.0
- MATRA-Tandy				
Electronique	63	34	60	49.9
- MMC-MBC [expansion unknown]	147	40	580	99.0
- Ediciel	7	--	20	49.9
- Axel	--	--	10	35.0
Components	316	194	990	--
including:				
- MATRA-Harris	145	84	555	49.9
- Cimatel	--	--	20	49.7
- Comelin	107	79	260	99.9
Automation	450	336	960	--
including:				
- MATRA Datavision	80	37	120	55.0
Telecommunications	1,026	864	3,090	--
including:				
- Videotex and terminals	133	100	255	
- Temat	583	477	1,205	Subsidiaries of Sofimatel (held 65-percent by MATRA)

On the technological level, Jean-Luc Lagardere is pleased to point out that the choice of C-MOS, decided on in 1978, is the one toward which all the makers of semiconductors are converging. In addition to its second-source agreement, MATRA-Harris is tackling the job of transcription of the Intel N-MOS components into C-MOS.

What is the situation with Eurotechnique? "At the time of the first Components Plan, there was complementarity, but while the Thomson subsidiary is getting into doing C-MOS, well, we will be going into competition. As for the subsidies relative to the second Components Plan, they have not been defined yet. But there is never enough of them, for the need is immense.

#### Components: Immense Financing Needs

As regards the products, MATRA is asserting its presence in four areas: memories, with a range extended to 16 Kbit; prediffused networks; microcontrollers and microprocessors (H-MOS and C-MOS); and telecommunications circuits.

It estimates that 500,000 memories and 100,000 microprocessors have been produced since the end of 1982. In 1984, MATRA-Harris is going to double the surface-area of its clean rooms, multiplying production by the same factor. It should thus achieve volumes that are significant on the world level.

11267

CSO: 3698/359

## MICROELECTRONICS

### PHILIPS TO COMBINE COMMUNICATION, INFORMATION BRANCHES

Rotterdam NRC HANDELSBLAD in Dutch 5 Apr 84 p 9

[Article: "A Single New Product Division -- Philips Combines Communication and Information"]

[Text] Eindhoven, 5 April -- The board of directors of Philips wants to combine the product divisions of Telecommunication Systems and Data Systems into a single new product division: communication and information systems.

The directors of both product divisions have been instructed to draw up a plan to combine activities before 1 November.

For quite a while now, Philips has been striving for closer cooperation between both units in order to achieve better tuning of product policy and market policy. This has led to the joint development of sophomation, a universal network which allows existing information gathering systems to communicate with each other.

Throughout the world some 16,000 people are working in the telecommunications division of Philips. Data Systems employs about 12,000 workers. The combination fits into Philips' new policy of limiting the number of major industry groups, currently called product divisions.

#### Intertwining

That integration is considered necessary because, under the influence of technological developments, various products are becoming more and more intertwined.

In mid-March Philips announced that the product divisions Elektra Accoustics [ELA] and Science and Industry [S&I] would be combined. In that case it was a question of a more efficient market approach and better cooperation in the technological area.

It is thought within Philips circles that a few other product divisions have been marked to be combined. Mentioned are: Audio and Video, and also small household appliances and large household appliances.

At this time the Philips activities are still divided into 12 major industry groups; ultimately this will probably be reduced to 8.



The board of directors also plans to establish a Home Interactive Systems group as of 1 November. The reason for this is the increasing growing together of consumer electronics and professional systems. All kinds of new developments in the area, for example, of home banking and home shopping will substantially stimulate the use of home terminals in the future.

Game computers and home computers are already in the center of interest today. The Home Interactive Systems group will combine in this area all activities now dispersed within Philips.

8463

CSO: 3698/361

## MICROELECTRONICS

### PHILIPS REVENUE, PROFITS BY SECTOR IN 1983

Amsterdam ELSEVIERS WEEKBLAD in Dutch 7 Apr 84 p 7

[Article by Piet de Wit: "After Four Years of Reconstruction Philips Wants to Get Back to Business "]

[Text] A short while ago a union person described it pithily: "As a union movement, we must first push and pull. Now we have to run to keep pace with the new management." In 2 years Philips has shaken off the image of a lazy, bureaucratic giant. A strong market oriented aggressiveness is beginning to pay off.

It was toward the end of the meeting in which the board of directors had discussed the 1983 figures. A mood of optimism could be felt. The development of turnover and profits for 1984 were clearly expected to be very positive. President Wisse Dekker himself said what everybody in the room was well aware of: this year the turnover could grow to 50 billion guilders and profits to the never before achieved level of 1 billion guilders.

And something no top man of a world corporation would ever do, at that very moment Dekker decided that this prognosis could be made public. He personally gave instructions to print posters with the following text: 1984: up to a turnover of 50 billion guilders, that is good; supplies down 10 percent, that is better; profits to 1 billion guilders, that is best."

By the next morning, on Thursday, 8 March, Philips personnel saw this unheard of sign of optimism and self-confidence being displayed everywhere in the Dutch factories.

It is characteristic of the new drive which is radiating from Eindhoven to the 420 Philips plants in the world. It also fits exactly into Dekker's philosophy, specifically that you have to set down the goals to be achieved very clearly and that you should try as much as possible to establish one-head management, so that people can be made directly responsible for whether or not those goals are achieved.

Dekker himself talks about the "top down approach," management and authority go from the top down, whereby "top" very clearly tells "down" what is expected in terms of turnover and profits. No diffuse shared responsibilities and away with long, complicated lines of communication.

Even though to the outside Dr Wisse Dekker is very much the picture of the new Philips image, he is certainly not its sole architect. When Dekker became president in early 1982, the corporation had already sailed off on a course of rigorous restructurings. Even under his predecessor, Dr Nico Rodenburg -- who went through a rather lengthy illness during his presidency -- the board of directors gave virtual "carte blanche" to Vice President Martin Kuilman to implement a worldwide restructuring. Between 1980 and the end of 1983, about 1.6 billion guilders would be made available to him for that purpose.

"We got somewhat behind in the program," Kuilman says now. "Not in terms of the original plan, but because things were added to it later on."

The bill also turned out higher than expected; according to Kuilman, by the end of 1984 it will have cost nearly 2.5 billion guilders in additional investments and social plans.

#### Line of March

Kuilman's views on establishing tasks are virtually identical to Dekker's. When he explained at the time how he would blow new life into the corporation, Kuilman presented his colleagues on the board of directors with a complete line of march, including both the costs and the returns. "If necessary you could settle with me on a monthly basis as far as the results are concerned," he told them.

The final goal of this line of march was announced at the time by Dekker in a very detailed series of interviews in which he accented his entry as president in the beginning of 1982. At that time it was not recognized by everyone that Dekker's prognosis -- "net profits must reach 2 to 2.5 percent of the turnover and then a further improvement will be possible, as long as the economy does not work too much against it" -- was precisely the goal for which Kuilman -- indeed supported by the whole board of directors -- had dared stick out his neck for within the organization.

Two percent of an estimated turnover of 50 billion guilders in 1984 is the 1 billion guilder net profit displayed on posters by Dekker.

"It costs that much, it will produce that much, you can hold me to that," Kuilman had said at the time. And now he is proud that everything turned out exactly the way he had promised. Last year the corporation booked a net profit of 647 million guilders and operating results of 6.0 percent of the turnover. (The peak was achieved in 1973 with a net profit of 846 million guilders and an operating result of 11.3 percent).

In recent years, his challenging task made Kuilman one of the heaviest users of the Philips' six Mystere company planes. He visited 100 plants per year and it was seldom that he distributed only praise. He very often demanded restructurings and retrenchments. The blows were particularly tough in our country where Philips implemented the most thorough changes. In 1975, Philips had 91,000 workers in the Netherlands, in 1980 the figure was 79,500, and in 1983 they ended up with 71,200.

That was exactly what Kuilman had wanted: he had set the goal for himself to raise the corporation's labor productivity -- measured in worldwide terms -- by 10 percent per year. In the Netherlands the goal was even higher, the result of our wage costs which kept the operating result very low.

Between 1977 and 1983, the growth in the volume of turnover at Philips amounted to 6 percent per year, the rise in labor productivity reached the goal of 10 percent per year: the loss of jobs is obvious.

#### Drop

An analysis of the results of the corporation as a whole shows that, in spite of the major changes which have been achieved, there are still a number of weak spots. In the product sector "Image and Sound for Consumer Application" (for example radio, television and video recorders) there is talk of a continuing drop in the operating results. Even down to negative 1.6 percent in 1983. And this, notably, in a segment which represents 25 percent of the corporation's turnover!

The first attack on returns in this sector came through the rapid and successful penetration by Japanese industry into the hi-fi market. Japan came to Europe with top quality systems, which had been completely developed on their home market and the development costs of which had already been paid off. At that time Philips was particularly weak at the top of the market; Eindhoven served the whole broad middle level. For a long time it was easier for the Japanese companies to penetrate the market downwards than it was for Philips to conquer a market share upwards.

When this phase ended, problems arose around the video recorder. With the 2000-system they largely missed the boat. It is estimated that last year Philips built only 800,000 of them; its system partners -- the largest of which is Grundig -- together did not get much further than a quarter of a million. Because of losses due to undermanning in the VCR plants in Vienna and Krefeld, Philips is losing a great deal of money. The planned production of video recorders using the VHS system should bring improvement in this.

The operating result in this sector of a negative 195 million guilders in 1983 is in sharp contrast to, for example, the positive result of 897 million guilders in 1978.

The board of directors has made the demand that this sector should return to positive figures this year yet. On the one hand the market should do that -- the VHS is arriving and the hi-fi market does attract some, in numbers and in terms of margin --, on the other hand they will pursue automation and robotization.

What is remarkable is the shift from consumer audio and video products (30.9 percent of the corporation's turnover in 1977 to 25.2 percent in 1983) to professional products and systems. They went from 24.7 percent in 1977 to 31.1 percent last year. Furthermore, there is talk of regularly rising operating results.

In 1977 the operating result for professional systems was 4.8 percent, in 1980 it was 5.8 percent, and in 1983 they closed with 7.8 percent or 1142 million guilders. The original activity of Philips, the incandescent lamp, is also still doing well. Following the takeover of Westinghouse in America, Philips is now by far the world's largest light bulb producer. Furthermore, they achieve the highest profit percentages (operating results of 10.2 percent in 1983) in this activity.

Another shift is the rising importance of North America for the corporation's turnover. In 1977, Europe was good for 63.5 percent of the turnover as against 17.6 percent for North America. By 1983 Europe had dropped to 53 percent, North America had gone up to 27.5 percent.

However, the low operating results achieved in North America represent a relatively weak performance. Last year it was even below the European figures. The reason for this is the high investments made in America recently.

Aside from the (heavy) audio and video sector, the Philips leaders no longer have worries which are too great and too direct. Acquisitions will certainly be continued (this is to be expected particularly quickly in the sector of office automation) because it is specifically Dekker's firm conviction that you can remain big in this industry branch only by continuing to get bigger.

Meanwhile, the existing activities have become streamlined. Kuilman: "A very short while ago I once again asked our country organizations and major industry groups to formulate their wishes for the next 10 years. If they wanted to move to Taiwan they could say that too. But those desires no longer existed. They actually wanted only one thing, they once again really wanted to get back to business, they now wanted to prove themselves."

"For nearly 4 years, virtually all my energy and that of my colleagues went into restructuring. Now we are going to use all that talent to grow solidly. Man, at the moment the company is bursting from that drive."

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CSO: 3698/361

## MICROELECTRONICS

### BRIEFS

FUNDS FOR FRENCH FIRMS--Allocations to nationalized groups from the Ministry of Industry and Research will amount to 12.85 billion French francs for 1984, including 3 billion for the electronic sector alone. Thomson will receive 1 billion French francs, CGCT [General Telephone Engineering Company] 300 million, Thomson Telecommunications, 700 million (this is a new entity consisting of the communications activities of CGE [General Electricity Company] and Thomson). As for CGE, it will not receive any special budget allocation because it made a net profit of 640 million francs in 1983. Finally, Bull will get 1 billion French francs (compared with 1.5 billion in 1983); the decrease is due to the sale of Olivetti stock last October. [Text] [Paris ZERO UN INFORMATIQUE HEBDO in French 12 May 84 p 12] 9294

COS: 3698/368



## SCIENTIFIC AND INDUSTRIAL AFFAIRS

### FUNDS GRANTED BY ANVAR IN 1983 TO FRENCH INDUSTRIES

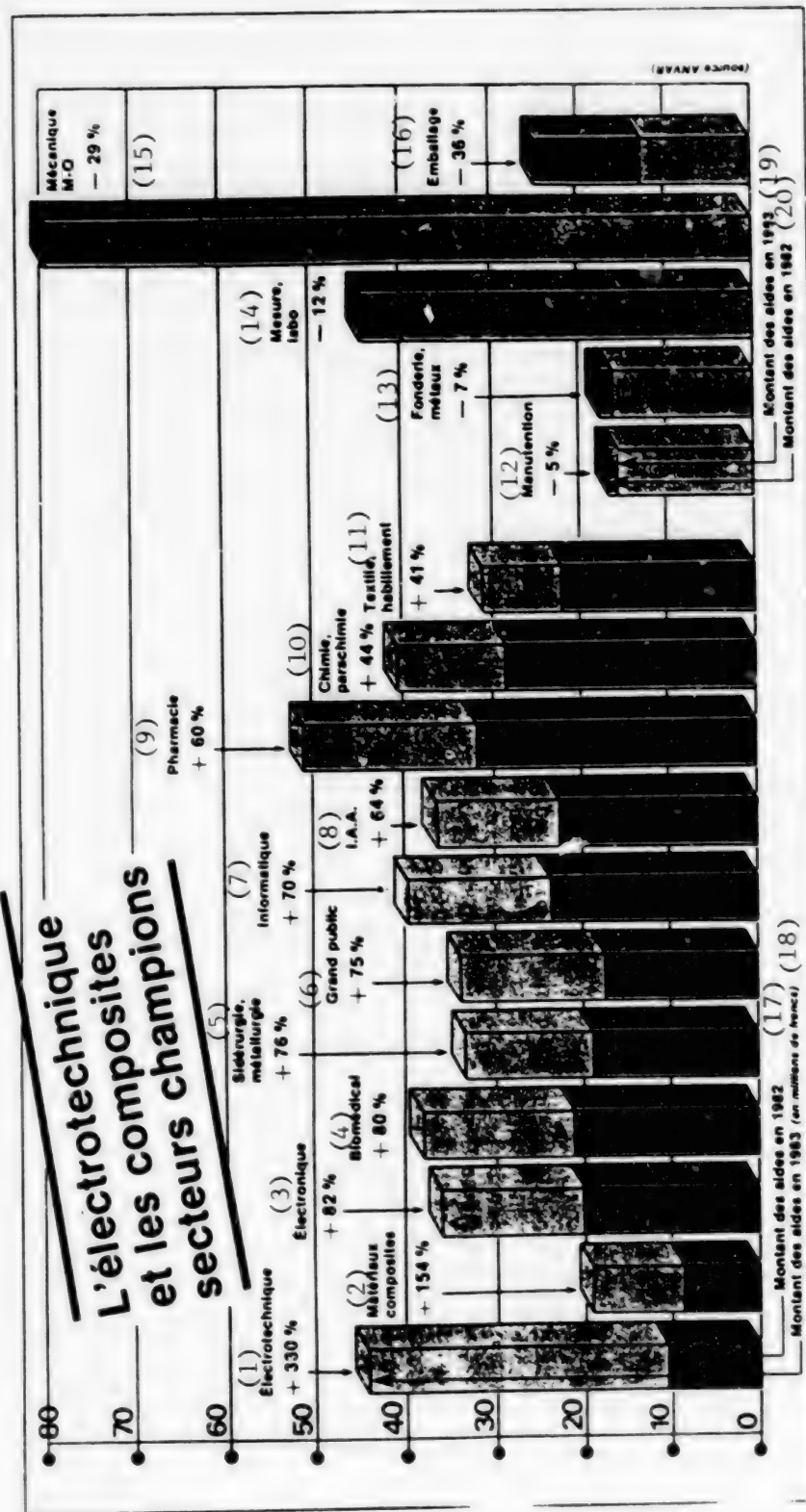
Paris INDUSTRIES ET TECHNIQUES in French 1 Mar 84 p 25

[Article: "1,500 Firms Helped by Anvar in 1983; 31 Percent Increase of the Budget to Benefit Nearly All Sectors"]

[Text] In 1983, the ANVAR [National Association for the Implementation of Research] granted 826 million francs in aids to innovation, compared with 629 million in 1982. There is a definite progress: + 31 percent. These funds were allocated to close to 2,900 firms (1,388 in 1982, 1,494 in 1983). A very nice sampling, and all the more representative as the Agency is represented in all regions and neglects no part of the industrial fabric. A breakdown of the firms into 40 sectors reveals that some 15 sectors are considerably more active than the average. The champion of champions is the electrical engineering sector. The number of innovating firms in that sector doubled within one year, and it received four times more money in 1983 than in 1982.

A large proportion of these funds was allocated to large revolving or static machines intended for the heavy industry. But this cannot conceal a proliferation of more modest innovations developed by small and medium-size firms (engines, components for automation and robotics, etc.).

Another champion, although with a narrower range, is the composite materials sector. Its dynamism is probably due to the fact that it is recent. But the present trend should not weaken, for the recent invitation to tender issued by ANVAR in this field is not yet reflected in these statistics. The electronic sector, ranking third if we consider the increase in the aids budget, covers only components and telecommunications. In this particular case, three large allocations are somewhat distorting the trend. According to an ANVAR official, the electronics sector as a whole, which overlaps with several sectors (consumer goods, biomedical sector, etc.), shows that the trend toward increased use of electronics is progressing only very slightly (111 million for 196 firms in 1982, compared with 117 million for 182 firms in 1983). Data processing is also progressing. But the number of "chosen" firms decreased. The microcomputer wave is still making itself felt, but ANVAR's choices have become more discriminating. In this field, innovations involve essentially displays and computer-aided design and manufacturing! As far as "sectors" are concerned, we should also mention the good progress of biotechnologies: 29 million in 1982, 56 in 1983. The prime mover in this progress: the health sector.



The Champions: Electrical Engineering and Composite Materials

Key:

1. Electrical engineering, +330%
2. Composite materials, +154%
3. Electronics, +82%
4. Biomedical sector, +80%
5. Steelmaking and metallurgy, +76%
6. Consumer goods, +75%
7. Data processing, +70%
8. Food and agribusiness, +64%
9. Pharmaceuticals, +60%
10. Chemical and paracheimical industries, +44%

11. Textile and clothing, +41%
12. Handling equipment, -5%
13. Foundry and metals, -7%
14. Measurement and laboratory equipment, -12%
15. Mechanical engineering and machine-tools, -29%
16. Packaging, -36%
17. Amount of 1982 aids
18. Amount of 1983 aids (million French francs)
19. Amount of 1983 aids
20. Amount of 1982 aids

The packaging sector shows a marked decline. But it could be only temporary. Besides, it is paradoxical to note that to save a firm ANVAR must sometimes refuse to help it. The agency provides only 50 percent of the cost of any research and development project. To encourage a firm that is in financial trouble to borrow would be too risky. In the case of the machine-tool sector, there is cause for greater concern: the sector as a whole is ailing.

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CSO: 3698/368

## SCIENTIFIC AND INDUSTRIAL POLICY

### ALLOTMENT OF FUNDS, TAX SUBSIDIES FOR FRG R&D

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German  
22 Mar 84 p 5

[Article by Dr Albert Probst, parliamentary state secretary in the Ministry of Research and Technology: "Project Support Is To Be Concentrated on Basic Technologies: State Support of R&D in Industry"]

[Text] The increasing subdivision of labor in the world economy which is additionally affected by obligatory support of technology in various countries requires that industry in the FRG while continuing to use new technologies must develop with greater emphasis than hitherto a technically high-level competitive line of goods and should employ corresponding cost-effective methods of manufacture. An important prerequisite of this is research in, development of and the scientific use of future-oriented technologies. The comparative advantages in competition arising from such a program improves our export chances, our growth and our level of employment.

In the FRG in 1983 about 46.8 billion DM were spent for research and development of which 31.6 billion DM or 67 percent were expended in industry. Industry itself finances 18 percent or 25.6 billion DM of all its expenditures for research and development (R&D). If one takes into account that out of 31.6 billion DM of outlays by industry for research and development 1.4 billion DM was for military research and development which is in response entirely to state orders, then one obtains a figure of 30.2 billion DM expended for civilian R&D in industry. The FRG financed R&D in the area of industry with a total of 5.3 billion DM.

The distribution of individuals active in research and development is consistent with the distribution of research outlays. Of a total of 370,000 persons in research (1981) 65 percent are in the industrial sector. Of these persons, moreover, not even one out of three is a scientist; 30.1 percent are technical personnel and the rest are various other auxiliary personnel. In what follows we shall present a picture of the scope of state support for research.

The state research expenditures for industry in the FRG are concentrated upon

i. defense research with about 1.4 billion DM in 1983 which is equivalent to 4.4 percent of the research outlays in the area of industry,

ii. support measures for civilian research and development up to about 15 percent of the total research outlays of industry; here once again the state support funds are concentrated on the government itself. The contribution made by the government and made by persons abroad (primarily through international organizations) encompasses 87 percent of the state research support.

In the following the account will concentrate mainly upon state measures in support of civilian research and development because defense department research arises from the special tasks of the state and has developed in recent years a number of support programs for research and development focusing on consulting services. Details concerning the activities of the German states may be obtained from Research Report VII which the FRG is issuing in 1984. Because of the dominant importance of the German Federal Government in research support, including also support through its legislative functions, particularly in the area of tax law, it is principally government support which will be described in the following.

In 1983 the approximately 31.6 billion DM of research expenditures in industry were supplied by

- i. 25.6 billion DM of in-house financing by industry,
- ii. 1.4 billion DM of FRG government funds for defense research,
- iii. 3.9 billion DM of government funds for civilian research and development,
- iv. 0.4 billion DM of support on the part of the German states,
- v. 0.4 billion DM from other sources, principally those abroad.

Support upon the part of the government in the area of industry is concentrated upon

i. tax easements and indirect funding measures by means of which R&D activity generally is supported and in which the government does not participate in defining the contents of individual projects. Of the outlays of the FRG in 1983 for R&D amounting to 12 billion DM about 44 percent was in the total industrial sector including defense research. For civilian research and development the government spent 10.2 billion DM. Of this, 39 percent went to commercial firms.

Two substantial tax remissions are at the present time of especial importance for research and development in industry:

- i. the allowance for R&D in accordance with Paragraph 4 of the Investment Allowance Law which annually results in about 300 million DM of tax remissions,

ii. the special write-offs for research and development which have been in effect since 1983 and are expected to result in about 350 million DM in tax remissions in 1984.

Both tax policies have a feature which bears upon the small business section of the economy, that is, small and medium enterprises receive an additional tax benefit. The combination of the two tax remissions leads to a perceptible unburdening of research investments especially when the R&D investments extend over several years. The tax specifications for special write-offs as well as for the investment allowance are tailored to one another and supplement one another. In addition to these tax remissions for activity in the area of research and development which have as their indirect goal an increase in R&D results there are also some tax remissions which enhance the demand for technologically relevant products.

Altogether these tax remissions which stimulate demand for technologically relevant products are expected to result in 1984 in reduced tax collections amounting to about 600 million DM.

In addition, the government supports certain indirect measures:

- i. the program for R&D personnel cost funding,
- ii. the program for external contractual research which is being for the first time enlarged in its scope in 1984.

In recent years, especially with regard to criticism of state support for civilian projects, there has arisen the instrument of indirect-specific research support. This latter approach funds research, development and innovation in a specific area of technology. Here in particular may be mentioned:

- i. the special microelectronics program supporting special applications, which runs out in 1984,
- ii. the manufacturing technique program, which starts in 1984 and will run until 1988.

For direct support to civilian research and development on the part of enterprises in commercial industry the FRG expended 2.9 billion DM in 1983 of which 2.45 billion DM were spent by the research ministry. In 1982 the expenditures for project support amounted to 3.6 billion DM of which 3.1 billion DM was supplied by the research ministry.

The ministry of research thus administers 85 percent of the research funds of the government for funding projects. The remaining 15 percent is distributed among various departments, mainly the ministry of industry. In the past there has been criticism of this project support on the part of the research ministry (BMFT). However, here one must take into account the special circumstances associated with the BMFT's project support. The following table lists the support funds of the BMFT in 1982 for project support in commercial industry.



Industrial Project Support by the Ministry of Research (in millions of DM)

<u>Special Area</u>	<u>1981</u>	<u>1982</u>
1. Energy research without nuclear reactors	802.4	908.7
2. Nuclear reactors SNR and THTR	391.9	1,027.0
3. Transport and traffic	235.9	249.6
4. Space research	143.9	206.2
5. Information technology	139.5	187.8
6. Protection of raw materials	148.5	128.5
7. Humanization of work	55.9	67.9
8. Aeronautical research	63.8	68.5
9. Polar research	92.7	62.5
10. Environmental research	52.4	60.9
11. Other	188.4	175.3
Total with reactors	2,315.3	3,142.9
Total without reactors	1,923.4	2,115.9

There is here clearly a marked concentration in the area of energy research for which about 50 percent of the funds are being spent. In 1982 a high point was reached as a result of the supplementary budget which was necessary in order to guarantee financing of the advanced SNR and THTR reactors. Otherwise, however, the research ministry's project support in industry is concentrated precisely on those sectors which are the objects of tasks confronting the state, transport and traffic, space research, protection of raw materials, aeronautical research, polar research and environmental research.

These are areas which as a rule cannot be covered by private initiatives alone. The research policy--and this especially under the new German Federal Government--aims at concentrating its project support for the civilian area upon basic technologies. The broad research of industry is being supported through tax remissions and through indirect research support in which the state makes no project selection. Restructuring of research support on the part of the state was initiated through formulations by the ministry of industry as early as the latter part of the seventies. This restructuring was continued even more intensively by the new federal government beginning in the fall of 1982. If one considers the year 1983 then we find that about 3.4 billion DM were made available by the federal government for civilian research and development of which 0.85 billion DM were for SNR and THTR. Within the framework of the various programs of the federal government 851 million DM went to smaller and average-sized enterprises; that is, 32 percent of the support funds if one omits the large-scale projects for nuclear energy.

In 1983 there was an intensification of the tendency to broadly based indirect research support. Essentially this is through the manufacturing technology program which goes into effect as of 1984 and works through special write-offs for research and development and through expansion of the "external contractual research" program.

These measures have the consequence that the fraction of project support for civilian research and development without reactors was 57 percent in 1981, sank to 54 percent in 1982 and was about 50 percent in 1983. One can summarize by saying: every second research D-mark of the government for civilian research and development in industry is no longer supplied through the support of projects but through indirect measures including tax remissions.

The funds for the large-scale SNR and THTR projects have been excluded from the above figures because by their nature they can be financed only through project support. The decisive fact is that the concentration of project support upon basic technologies of civilian research and development is being accelerated and that indirect research support has gained in importance.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### ROLE OF JOINT VENTURES, NEW MARKETS IN SIEMENS PROFIT INCREASE

Zurich NEUE ZUERCHER ZEITUNG in German 30 Mar 84 p 15

[Article: "Satisfaction in the Philips Concern: An Aggressive Attitude in the Future"]

[Text] T. H. Duesseldorf, 28 March. According to Vice President Van der Klugt Philips is experiencing a "certain degree of satisfaction" over its successful doubling of its net profit in the course of 2 years. As has already been announced in the past year the net profit improved by 49 percent up to 647 million hfl. The most recent results inspire confidence in the future according to Van der Klugt at the press conference held on the occasion of the company's financial report. He declared that the great sacrifices of the past year in the form of restructuring and adaptation had paid off. Certainly, the concern is not yet content in all areas. For example, entertainment electronics, according to him, must still strive to repeat the successes of earlier years.

#### Here Europe, There America

Philips attributes the red figures which it has been necessary to enter into the entertainment electronics column for 1983 to a high market saturation, the comparably weak competition in Europe and also to the sharp price war and the startup costs for new products. The central role played here by the development of demand is illustrated in the area of color television sets. In the past year this portion of the market has grown only by 2 percent in Europe; at an average productivity growth of 9 percent there exists a disproportion which puts the results under pressure. As long as no stronger stimulus emerges in Europe Philips is inclined to simply maintain capacity as long as productivity does not increase at a clearly higher rate. Sales in Europe increased only slightly to 24.9 (24.1) billion hfl; the corresponding fraction of total company sales sank to 54 percent (56 percent). Development in the United States and in Canada was quite different: at a sales increase to 12.7 (9.8) billion hfl the fraction of the concern's total sales rose to 28 percent (23 percent). This widening gap is also a reason for Philips to once again bring attention now as in the past within the European Economic Community to existing obstacles to trade.

## Offering Double Stakes to the Japanese

The takeover of Grundig is expected to provide more work for Europe. Van der Klugt declared that this tightening up had not been with the object of shutting down capacities but that he hoped for an improvement at the paymaster and at the job sites in order to be able to counter the Japanese competitors. The general strategy is so designed that Grundig will run its own product policy and the German Philips Company will have nothing directly to do with its new acquisition. In certain markets they will even compete. Both enterprises are expected to become stronger; a basis for this expectation is seen especially in cost reduction resulting from joint or mutually harmonious manufacture of key components. However, the manufacture of entire devices differing only in the signatures they bear is being excluded.

## New Challenges

Following the takeover of Grundig, Philips is alongside Matsushita and with a comparable spectrum of products is the world's largest supplier. In view of the shortened life span of products and in view of the increasing capitalization cost for new developments and bearing in mind the risks which exist in markets like the home computer market (people pointed out Warner's loss of millions) the question also arises for Philips: With what configurations can one respond to these challenges? The concern aims at attaining or securing a leading position in the most important sectors and at sustaining itself in this position independently, with the accent being placed upon an aggressive posture distinguished by a flexible approach to accelerated product development. If, nevertheless, the company looks for alliances this is merely because of the unavoidable need for cost reduction and research concentration. As an example, there may be adduced the company's cooperation with ATT in the sector of public communications systems where the sharp boundaries of the joint venture make it clear that Philips does not seek "marriage to an elephant."

There has been a further increase in the importance of products and systems for professional applications as well as in the importance of supplies to industry. The output of operations in the areas named improved to 1,142 (971) million hfl and to 549 (-21) million hfl in these areas respectively and thus represents more than half of the 3,755 (2,130) billion hfl figure to which the total output has increased. With the exception of the illumination and batteries column the results in the other sectors were retrograde. The changed relative importance of the individual sectors will also have its effect upon this year's investment policy. The company intends to emphasize the production of solid-state memories, integrated circuits and color picture tubes.

There have been significant shifts in the distribution of capital stock. Only 47 percent (57 percent) is held in the Netherlands, 10 percent (17.5 percent) in the FRG and likewise 10 percent (13 percent) in Switzerland. On the other hand already 25 percent is held in the United States; a year ago it had only reached 3 percent.

## Stagnating Sales of the Swiss Philips

The Swiss enterprises of the Philips group were able to expand their sales last year only slightly from 451 million franc to 454 million franc. As was already the case in the preceding year when there were losses of 3.2 percent the cause lay in export difficulties. While deliveries to foreign companies were once again lagging behind last year's figures, in its Swiss business Philips was able to make some slight advances. In response to the production picture there was, moreover, a slight regression in money supply, as was already the case last year. There was a further reduction in the number of personnel from 1,623 to 1,596 persons.

Philips AG in Zurich, 100 percent a daughter firm of NV Philips Gloeilampenfabrieken in Eindhoven, characterizes its expectations for 1984 as "restrained optimism." In addition to its business with electrical and electronic products in the areas of consumer goods and production goods as well as its business with structural components and corresponding services the Swiss company last year manufactured contact strips, printed circuit boards and communications engineering equipment. The plant in Binz ZH which was established toward the end of the forties is now with its approximately 400 workers and its manufacture of connectors (contact strips) the only production and development center for the entire company. Besides this, the compact discs which were put on the market in Switzerland a year ago produced what was described by C. J. van der Klugt, vice president of company management, as a "success story." He said that this product "as the foremost system of entertainment electronics after being present for 5 years on the market will probably achieve penetration of the sound barrier at 5 percent of the market."

Philips AG, Zurich, also owns 100 percent of the following firms: the Fred Liechti Apparatus Factory AG in Ostermundigen, the Mediator Commercial Firm AG, Zurich, and the Electronic Data Processing Software Specialist Polysupport Company in Zurich. In the area of the newest technologies, Philips AG owns 75 percent of Faselec in Zurich which produces semiconductors and it also owns 50 percent of Videlec AG, Lenzburg, which develops and produces liquid crystal displays. Cooperation between the mother company and the American telephone giant AT&T gave rise in the beginning of 1984 to the AT&T and Philips Telecommunications AG, Zurich.

Switzerland is in addition also of importance to the Dutch company in terms of capital. On the one hand the Philips Participants AG Financing Company serves the entire concern. On the other hand as has been mentioned about 10 percent of the capital stock of 1.7 billion hfl is located in Switzerland.

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## SCIENTIFIC AND INDUSTRIAL POLICY

### BRIEFS

SIEMENS EXPANDS REGENSBURG FACILITIES--Munich--The Siemens Company in Munich according to its own announcements is going to start manufacturing highly integrated circuits, amongst others the 1-Mbit memory, in 1986 in Regensburg. The company will first invest about 400 million marks in the development and manufacture of integrated circuits in micrometer and submicrometer technology (structures around and below one-thousandth of a millimeter in size). According to the Siemens announcement such advanced circuits will be developed and manufactured jointly by the "technology" Central Section and by the "structural components" entrepreneurial section. To this end there is being erected on the terrain of the structural components plant in Regensburg a manufacturing facility for integrated circuits which in its first stage of construction will cost about 200 million marks. Investments of about the same magnitude are planned for the construction of research and development facilities in Munich-Perlach. In the course of this fiscal year about 100 additional technical-scientific workers will be active to accelerate this project in the "technology" Central Section and in the "structural components" entrepreneurial section. At the present time Siemens is the only European entrepreneur offering the 64-Kb memory out of its own development and manufacture and is preparing mass production of the 256-Kb memory. The 256-Kb manufacturing is taking place in Villach. Sample quantities are expected to be available as early as this year; Siemens will be in a position to make deliveries in 1985. [Text] [Munich COMPUTERWOCHE in German 17 Feb 84 p 13] 8008

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